



## ***ANNUAL GROUNDWATER MONITORING REPORT 2009***

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***Railroad Commission of Texas***

***Flessner Investigation***

***Rosharon, Texas***

***Fort Bend County***

***Cleanup Code Number: CU-03-54163***

***Requisition Number: 455-9-0556***

***Field Name: Nash Dome (64535001)***

***Quantum Project No.: H90014***

***April 13, 2009***

# ***ANNUAL GROUNDWATER MONITORING REPORT 2009***

**Railroad Commission of Texas**

**Flessner Investigation  
Rosharon, Texas  
Fort Bend County**

**Quantum Project No.: H90014**

**April 13, 2009**

Prepared For:

**Mr. Brian Voyles/Mr. Byron Krysher  
Railroad Commission of Texas  
1706 Seamist Drive, Suite 501  
Houston, Texas 77008**

Prepared by:

**Quantum Environmental Consultants, Inc.  
1308 South Loop West  
Houston, Texas 77054**

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William L. Beasley, Jr., Project Manager

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Bennie L. Benford, Jr., Operation Manager

## TABLE OF CONTENTS

<b>I. REPORT SUMMARY .....</b>	<b>1</b>
<b>II. CHRONOLOGY OF EVENTS.....</b>	<b>2</b>
<b>III. GROUNDWATER REVIEW.....</b>	<b>3</b>
A. Groundwater Monitoring	
B. Groundwater Analysis	
C. Waste Management and Disposition	
<b>IV. CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>4</b>
<b>V. QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES.....</b>	<b>5</b>

## FIGURES

- Figure 1 – Site Map
- Figure 2 – Groundwater Gradient Map (February 26, 2009)
- Figure 3 – Groundwater Concentration Map (February 26, 2009)

## TABLES

- Table 1 – Summary of Groundwater Analytical Results
- Table 2 – Summary of Groundwater Measurements

## APPENDICES

- Appendix A – Figures
- Appendix B – Tables
- Appendix C – Groundwater Laboratory Reports and Chain-of-Custody Documentation
- Appendix D – Waste Management Documentation
- Appendix E – Specific Site and Health and Safety Plan

## **I. REPORT SUMMARY**

Quantum Environmental Consultants, Inc. (Quantum) has completed groundwater monitoring for the 2009 annual period for the Flessner Investigation Site, Rosharon, Fort Bend County, Texas (herein referred to as the Subject Property). This annual report summarizes the results of the groundwater-monitoring event conducted on February 26, 2009.

The groundwater sampling event was conducted to determine the extent of dissolved-phase and non-aqueous phase liquids (NAPL) at the site. Site activities included groundwater level measurements, measurement of NAPL thickness (if present), and collection of groundwater samples for laboratory analysis of dissolved benzene, toluene, ethylbenzene, and xylenes (BTEX), total petroleum hydrocarbon (TPH), barium and chloride concentrations.

On February 26, 2009 groundwater samples were collected from all three monitoring wells since no wells exhibited measurable NAPL thickness. The laboratory results from this event indicated benzene, toluene, ethylbenzene, and xylenes (BTEX) and TPH concentrations below detection limits for all monitoring wells. Barium concentrations ranged from 0.839 mg/L in MW-2 to 3.180 mg/L in MW-3. Chloride concentrations ranged from 70,200 mg/L in MW-1 to 78,600 mg/L in MW-2.

Based on water levels measurements taken on February 26, 2009, the depths to groundwater ranged from 11.41 feet to 16.38 feet. The potentiometric surface for the February 26, 2009 event indicates groundwater flows to the north-northeast with an estimated hydraulic gradient of 0.011 ft/ft. Purged groundwater generated during the monitoring events was transported to an approved facility for disposal.

## **II. CHRONOLOGY OF EVENTS**

The following is a chronology of environmental activities conducted at the Subject Property.

July 1, 2002                      A groundwater gauging event was conducted at the Subject Property.

February 26, 2009            2009 groundwater monitoring and sampling event was conducted at the Subject Property.

### **III. GROUNDWATER REVIEW**

Site activities included groundwater level measurements and collection of groundwater samples for laboratory analysis of dissolved BTEX, TPH, chloride and barium.

#### **A. Groundwater Monitoring**

Prior to collecting groundwater samples, all monitoring wells were gauged using an interface probe to determine potentiometric groundwater levels and to determine non-aqueous phase liquids (NAPL) thicknesses.

Based on water levels measured on February 26, 2009, the depths to groundwater ranged from 11.41 feet to 16.38 feet below top of casing (TOC).

The potentiometric surface for the February 26, 2009 event indicates groundwater flow to the north-northeast with an estimated hydraulic gradient of 0.02 ft/ft. Cumulative groundwater gauging data is summarized in Table 2. A Site Map and Groundwater Gradient Map for the February 26, 2009 event are presented as Figures 1 & 2, respectively.

#### **B. Groundwater Analysis**

On February 26, 2009 groundwater samples were collected from all three monitoring wells since no wells exhibited measurable NAPL thickness. The laboratory results from this event indicated benzene, toluene, ethylbenzene, and xylenes (BTEX) and TPH concentrations below detection limits for all monitoring wells. Barium concentrations ranged from 0.839 mg/L in MW-2 to 3.180 mg/L in MW-3. Chloride concentrations ranged from 70,200 mg/L in MW-1 to 78,600 mg/L in MW-2. A summary of analytical results is included in Table 1. A Groundwater Contaminant Concentration Map indicating results for this sampling event is included as Figure 3.

#### **C. Waste Management and Disposition**

Approximately 20 gallons of fluids were purged and temporarily stored on site during this sampling event. All purged groundwater generated has been removed from the property and transported to an approved disposal facility. Waste manifests documentation is included in Appendix. D.

#### **IV. CONCLUSIONS**

The groundwater samples collected from monitoring wells MW-1, MW-2, and MW-3 indicated BTEX and TPH concentrations below the detection limits and below the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Residential Protective Concentration Level (PCL) for each chemical of concern (COC). Barium concentrations ranged from 0.839 mg/L in MW-2 to 3.180 mg/L in MW-3. Chloride concentrations ranged from 70,200 mg/L in MW-1 to 78,600 mg/L in MW-2.

## **V. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROCEDURES**

Quantum provides strict quality assurance/quality control (QA/QC) procedures to ensure that samples collected are valid representatives of each sampling location.

### **Groundwater Sampling**

Monitoring wells were developed and purged utilizing a clean PVC bailer. The bailer was decontaminated prior to each use with an Alconox™ detergent and rinsed with distilled water. Three well volumes were purged from all monitoring wells exhibiting sufficient recharge. Monitoring wells that did not recharge sufficiently were bailed dry.

After purging the wells, groundwater samples were obtained using dedicated, disposable Teflon bailers by field personnel wearing clean, disposable gloves. Groundwater sample containers were filled in order of decreasing volatility (i.e., BTEX were filled first, then TPH) along with the remaining chemicals.

Groundwater samples collected for BTEX and TPH analysis were placed in 40-ml glass VOA vials equipped with Teflon-lined caps supplied by the testing laboratory. The vials were filled to a positive meniscus, sealed, and visually checked for the presence of air.

Groundwater samples collected for barium and chloride analysis were filled to capacity in two plastic (160-ml) containers equipped with Teflon-lined caps supplied by the testing laboratory.

The filled sample containers were labeled, placed on ice in an insulated cooler, and chilled to an approximate temperature of 39.1° F (4° C). The cooler was sealed (including a custody seal) for transportation to the testing laboratory. Strict chain-of-custody was maintained throughout the sampling process.

### **Laboratory Protocol**

The laboratory was responsible for proper QA/QC procedures. These procedures are either transmitted with the laboratory reports or are on file at the laboratory. Groundwater samples were transported to an approved laboratory for analysis with applicable holding times for Barium, Chloride, TPH and BTEX using the following methods:

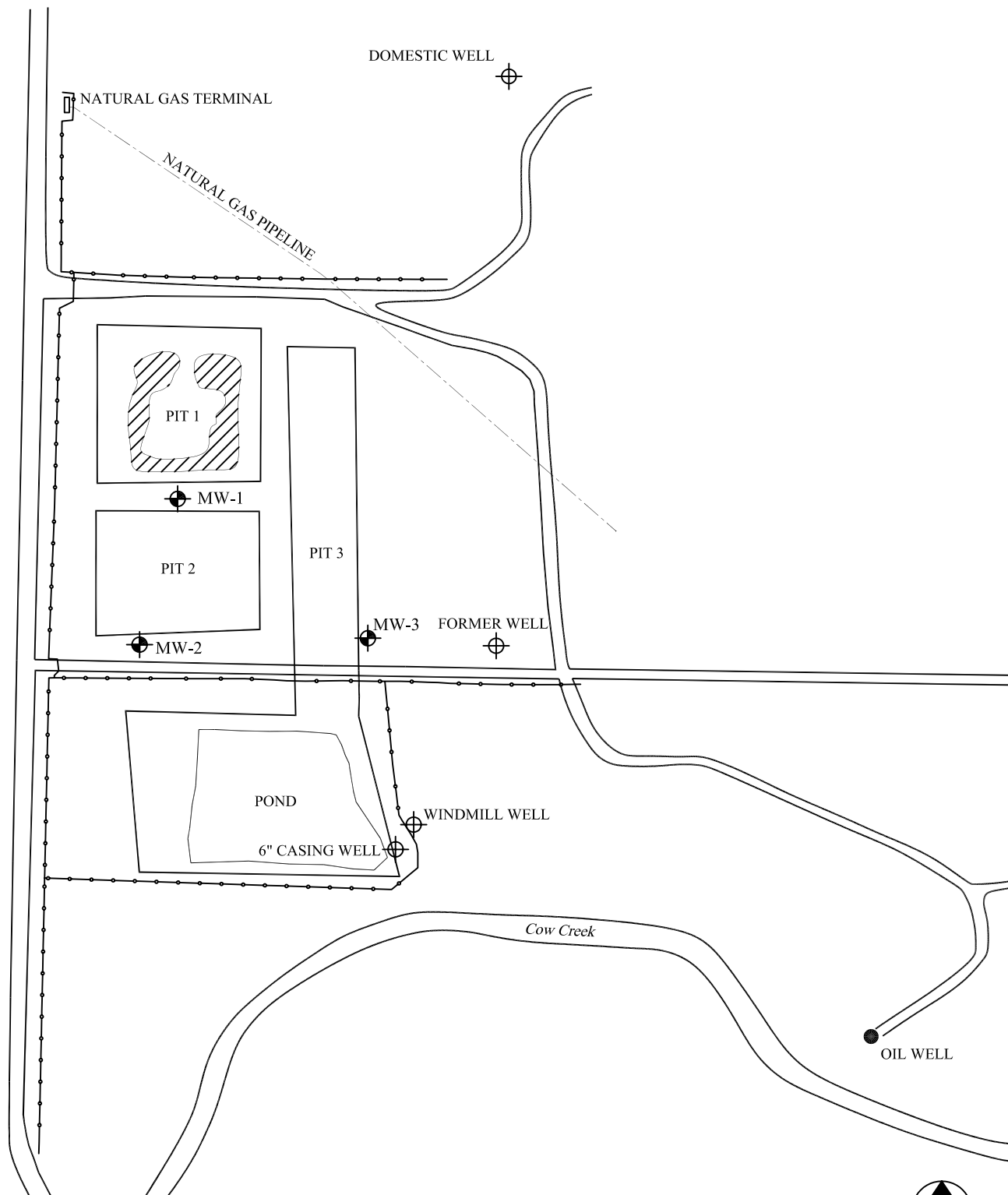
Barium by EPA Method E 200.8, Chloride by EPA Method E300, total petroleum hydrocarbon (TPH) by TCEQ Method TX1005 and BTEX by EPA Method SW 8060B.



## **APPENDICES**

## **APPENDIX A**

### **Figures**

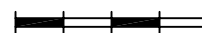


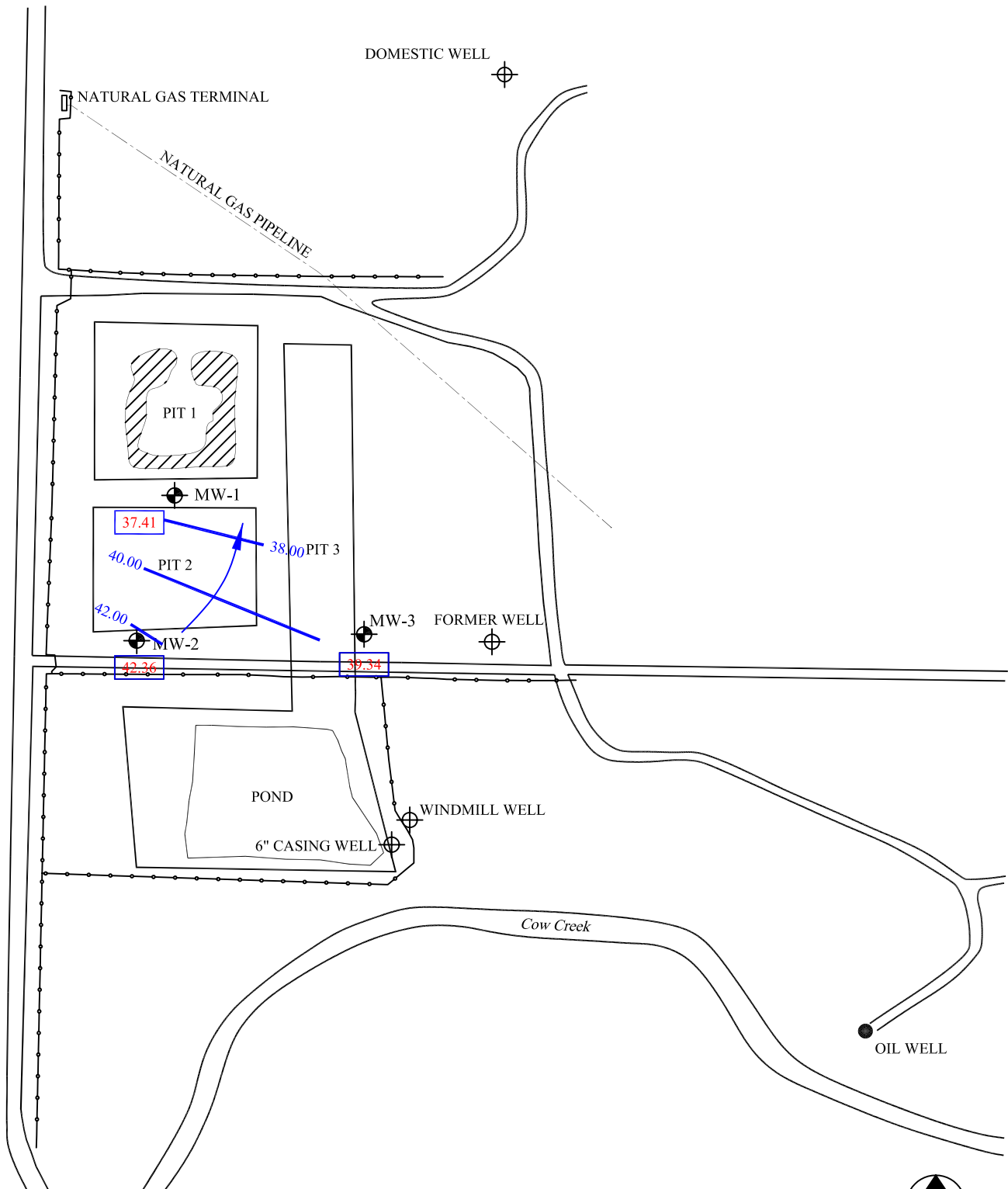
# **LEGEND**

- **SOIL BORING LOCATIONS**
- ⊕ **MONITOR WELL LOCATIONS**
- **FENCE**



**SCALE 1" = 200'**



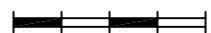


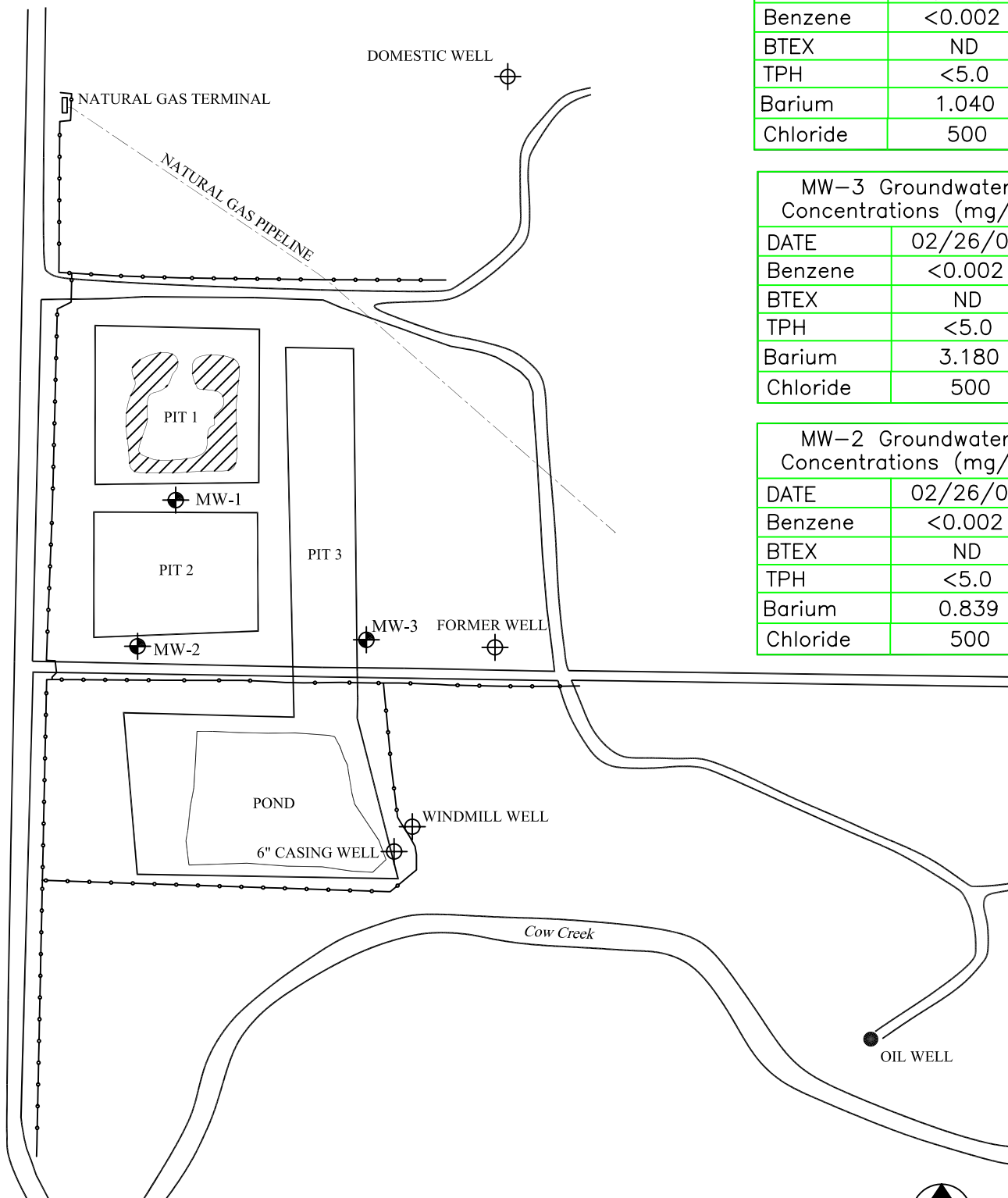
# **LEGEND**

- SOIL BORING LOCATIONS
- ⊕ MONITOR WELL LOCATIONS
- FENCE



SCALE 1" = 200'



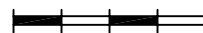


#### LEGEND

- SOIL BORING LOCATIONS
- ⊕ MONITOR WELL LOCATIONS
- FENCE



SCALE 1" = 200'



#### MW-1 Groundwater Concentrations (mg/L)

DATE	02/26/09
Benzene	<0.002
BTEX	ND
TPH	<5.0
Barium	1.040
Chloride	500

#### MW-3 Groundwater Concentrations (mg/L)

DATE	02/26/09
Benzene	<0.002
BTEX	ND
TPH	<5.0
Barium	3.180
Chloride	500

#### MW-2 Groundwater Concentrations (mg/L)

DATE	02/26/09
Benzene	<0.002
BTEX	ND
TPH	<5.0
Barium	0.839
Chloride	500

## **APPENDIX B**

### **Tables**

**TABLE 1**  
**SUMMARY OF LABORATORY RESULTS FOR GROUNDWATER SAMPLES**  
**FROM MONITORING WELLS**  
**(concentrations in mg/L)**

**Railroad Commission of Texas**  
**Flessner Investigation**  
**Fort Bend County**  
**Rosharon, Texas**  
**Cleanup Code Number: CU-03-54163**  
**Requisition Number: 455-9-0556**

Well ID	Date	Benzene (mg/L)	Toluene (mg/L)	Ethyl-benzene (mg/L)	Total Xylenes (mg/L)	Total BTEX (mg/L)	TPH C6-C12 (mg/L)	TPH >C12-C28 (mg/L)	TPH >C28-C35 (mg/L)	TPH C6-C35 (mg/L)	Chloride (mg/L)	Barium (mg/L)
MW-1	02/26/09	<0.002	<0.002	<0.002	<0.002	ND	<5	<5	<5	<5	70,200	1.040
MW-2	02/26/09	<0.002	<0.002	<0.002	<0.002	ND	<5	<5	<5	<5	78,600	0.839
MW-3	02/26/09	<0.002	<0.002	<0.002	<0.002	ND	<5	<5	<5	<5	73,300	3.180

BTEX analyzed by EPA Method 8260B and Chloride analyzed by EPA Method E300.

ND= Not Detected

NA= Not Analyzed

**TABLE 2**  
**SUMMARY OF MONITOR WELL INFORMATION**  
**AND FLUID LEVEL MEASUREMENTS**  
(measurements in feet)

**Railroad Commission of Texas**  
**Flessner Investigation**

**Fort Bend County**  
**Rosharon, Texas**  
**Cleanup Code Number: CU-03-54163**  
**Requisition Number: 455-9-0556**

Well ID	Date Gauged	Top-of Casing Elevation*	Total Depth (ft)	Screen Length (ft)	Top of Screen Elevation*	Depth to Water (ft)	Product Thickness (ft)	Corrected Groundwater Elevation*	Longitude	Latitude
MW-1	07/01/02	53.79	31.18	20.00	42.61	18.92	---	34.87	95.65311	29.29641
	02/26/09	53.79	31.33	20.00	42.61	16.38	---	37.41		
MW-2	07/01/02	53.77	27.02	20.00	46.75	17.95	---	35.82	95.65328	29.29583
	02/26/09	53.77	27.00	20.00	46.75	11.41	---	42.36		
MW-3	07/01/02	53.57	28.12	20.00	45.45	17.53	---	36.04	95.65228	29.29581
	02/26/09	53.57	28.18	20.00	45.45	14.23	---	39.34		

\*Elevation data based on North American Vertical Datum of 1998 (NAVD 88)

Note: Depth-to-water measurements are from top-of-casing



## **APPENDIX C**

### **Groundwater Laboratory Reports and Chain-of-Custody Documentation**

**Anacon, Inc.****Date:** 18-Mar-09

**CLIENT:** Railroad Commission of Texas - Houston  
**Lab Order:** 0902239  
**Project:**  
**Lab ID:** 0902239-001

**Client Sample ID:** MW-1  
**Collection Date:** 2/26/2009 12:15:00 PM

**Matrix:** WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
<b>ICP-MS METALS</b>		<b>E200.8</b>				Analyst: <b>HN</b>
Barium	1040	1.00		µg/L	1	3/2/2009 7:10:00 PM
<b>VOLATILE ORGANIC COMPOUNDS IN WATER BY</b>		<b>SW8260B</b>				Analyst: <b>KK</b>
Benzene	ND	2.00		µg/L	1	3/5/2009 7:57:00 PM
Ethylbenzene	ND	2.00		µg/L	1	3/5/2009 7:57:00 PM
m,p-Xylene	ND	4.00		µg/L	1	3/5/2009 7:57:00 PM
o-Xylene	ND	2.00		µg/L	1	3/5/2009 7:57:00 PM
Toluene	ND	2.00		µg/L	1	3/5/2009 7:57:00 PM
Surr: 1,2-Dichloroethane-d4	113	59-153		%REC	1	3/5/2009 7:57:00 PM
Surr: 4-Bromofluorobenzene	99.8	80-131		%REC	1	3/5/2009 7:57:00 PM
Surr: Dibromofluoromethane	106	76-140		%REC	1	3/5/2009 7:57:00 PM
Surr: Toluene-d8	86.6	60-142		%REC	1	3/5/2009 7:57:00 PM
<b>TPH FOR WATER</b>		<b>TX1005</b>				Analyst: <b>JS</b>
TPH (C6 - C35)	ND	5.00		mg/L	1	3/9/2009
TPH (C6 - C12)	ND	5.00		mg/L	1	3/9/2009
TPH (C12 - C35)	ND	5.00		mg/L	1	3/9/2009
<b>ANIONS BY ION CHROMATOGRAPHY</b>		<b>E300</b>				Analyst: <b>KK</b>
Chloride	70200	500		mg/L	1000	3/17/2009

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
E - Value above quantitation range

**Anacon, Inc.****Date:** 18-Mar-09

**CLIENT:** Railroad Commission of Texas - Houston  
**Lab Order:** 0902239  
**Project:**  
**Lab ID:** 0902239-002

**Client Sample ID:** MW-2  
**Collection Date:** 2/26/2009 12:20:00 PM

**Matrix:** WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
<b>ICP-MS METALS</b>		<b>E200.8</b>				Analyst: <b>HN</b>
Barium	839	1.00		µg/L	1	3/2/2009 7:16:00 PM
<b>VOLATILE ORGANIC COMPOUNDS IN WATER BY</b>		<b>SW8260B</b>				Analyst: <b>KK</b>
Benzene	ND	2.00		µg/L	1	3/5/2009 8:23:00 PM
Ethylbenzene	ND	2.00		µg/L	1	3/5/2009 8:23:00 PM
m,p-Xylene	ND	4.00		µg/L	1	3/5/2009 8:23:00 PM
o-Xylene	ND	2.00		µg/L	1	3/5/2009 8:23:00 PM
Toluene	ND	2.00		µg/L	1	3/5/2009 8:23:00 PM
Surr: 1,2-Dichloroethane-d4	112	59-153		%REC	1	3/5/2009 8:23:00 PM
Surr: 4-Bromofluorobenzene	99.4	80-131		%REC	1	3/5/2009 8:23:00 PM
Surr: Dibromofluoromethane	104	76-140		%REC	1	3/5/2009 8:23:00 PM
Surr: Toluene-d8	83.9	60-142		%REC	1	3/5/2009 8:23:00 PM
<b>TPH FOR WATER</b>		<b>TX1005</b>				Analyst: <b>JS</b>
TPH (C6 - C35)	ND	5.00		mg/L	1	3/9/2009
TPH (C6 - C12)	ND	5.00		mg/L	1	3/9/2009
TPH (C12 - C35)	ND	5.00		mg/L	1	3/9/2009
<b>ANIONS BY ION CHROMATOGRAPHY</b>		<b>E300</b>				Analyst: <b>KK</b>
Chloride	78600	500		mg/L	1000	3/17/2009

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
E - Value above quantitation range

**Anacon, Inc.****Date:** 18-Mar-09

**CLIENT:** Railroad Commission of Texas - Houston  
**Lab Order:** 0902239  
**Project:**  
**Lab ID:** 0902239-003

**Client Sample ID:** MW-3  
**Collection Date:** 2/26/2009 12:25:00 PM

**Matrix:** WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
<b>ICP-MS METALS</b>		<b>E200.8</b>		Analyst: <b>HN</b>		
Barium	3180	1.00		µg/L	1	3/2/2009 7:35:00 PM
<b>VOLATILE ORGANIC COMPOUNDS IN WATER BY</b>		<b>SW8260B</b>		Analyst: <b>KK</b>		
Benzene	ND	2.00		µg/L	1	3/5/2009 8:50:00 PM
Ethylbenzene	ND	2.00		µg/L	1	3/5/2009 8:50:00 PM
m,p-Xylene	ND	4.00		µg/L	1	3/5/2009 8:50:00 PM
o-Xylene	ND	2.00		µg/L	1	3/5/2009 8:50:00 PM
Toluene	ND	2.00		µg/L	1	3/5/2009 8:50:00 PM
Surr: 1,2-Dichloroethane-d4	111	59-153		%REC	1	3/5/2009 8:50:00 PM
Surr: 4-Bromofluorobenzene	102	80-131		%REC	1	3/5/2009 8:50:00 PM
Surr: Dibromofluoromethane	106	76-140		%REC	1	3/5/2009 8:50:00 PM
Surr: Toluene-d8	88.1	60-142		%REC	1	3/5/2009 8:50:00 PM
<b>TPH FOR WATER</b>		<b>TX1005</b>		Analyst: <b>JS</b>		
TPH (C6 - C35)	ND	5.00		mg/L	1	3/9/2009
TPH (C6 - C12)	ND	5.00		mg/L	1	3/9/2009
TPH (C12 - C35)	ND	5.00		mg/L	1	3/9/2009
<b>ANIONS BY ION CHROMATOGRAPHY</b>		<b>E300</b>		Analyst: <b>KK</b>		
Chloride	73300	500		mg/L	1000	3/17/2009

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
E - Value above quantitation range

A N A C O N  
**ANALYSIS** INC.

730 Fm 1959  
Houston, TX 7

[Tendering of above described samples to AnalySys, Inc. for analytical testing constitutes agreement by buyer/sampler to AnalySys, Inc.'s standard terms.]

## **APPENDIX D**

### **Waste Management Documentation**

# Holcomb Oil Recycling

29087

## NON-HAZARDOUS MANIFEST

### GENERATOR

Generator Quantum Environmental  
Shipping Location \_\_\_\_\_  
Address Kushkonong, Texas  
Phone \_\_\_\_\_

Manifest Return Address \_\_\_\_\_

Phone \_\_\_\_\_

Description of Waste Materials	Total Quantity	Unit of Measure	Container Type	Unit Price	Extension
<u>used water</u>	<u>20</u>	<u>gals</u>	<u>Drums</u>		

I hereby certify that the above described materials are not hazardous wastes as defined by 40 CFR. Part 261 or any applicable state law or regulation, have been fully and accurately described, classified and packaged, and are in proper condition for transportation according to applicable law and regulations.

Generator Authorized Agent Name \_\_\_\_\_

Signature [Signature]Delivery Date 3/27/09

### TRANSPORTER

Transporter Name

Address

**Holcomb Oil Recycling**  
**6228 Osprey**  
**Houston, Texas 77048**

Driver Name (Print) Patrick HolcombTruck Number 404Truck Type Tank truck

I hereby acknowledge that the above-described materials were received from the generator shipping location and were transported without incident to the destination listed below.

I hereby acknowledge receipt of the above described materials for transport from the generator shipping location listed above.

Driver Signature [Signature]Shipment Date 3/27/09

Driver Signature \_\_\_\_\_

Delivery Date \_\_\_\_\_

### DESTINATION

Site Name

Address

**Holcomb Oil Recycling**  
**6228 Osprey**  
**Houston, Texas 77048**

EPA ID # TXD982760258STATE ID # 85038Phone Number (713) 991-4005

I hereby acknowledge receipt of the above described materials.

Name of Authorized Agent (Print) \_\_\_\_\_

White Original

Driver Signature \_\_\_\_\_

Delivery Date \_\_\_\_\_

Canary Disposer Retain

Pink Generator Retain

# **APPENDIX E**

## **Site-Specific Health And Safety Plan**





## ***SITE-SPECIFIC HEALTH AND SAFETY PLAN***

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***Unidentified Site  
D. Flessner (09777) Lease  
Rosharon, Texas  
Fort Bend County***

***Railroad Commission of Texas  
1706 Seamist Drive, Ste. 501  
Houston, Texas 77008***

***Quantum Project No.: H90014***

***February 25, 2009***

***SITE-SPECIFIC  
HEALTH AND SAFETY PLAN***

**RAILROAD COMMISSION OF TEXAS**

***UNIDENTIFIED SITE***  
**ROSHARON, TEXAS**  
**FORT BEND COUNTY**

**Quantum Project No.: H90014**

**February 25, 2009**

Prepared for:

**Railroad Commission of Texas**  
**1706 Seamist Drive, Ste. 501**  
**Houston, Texas 77008**  
**Mr. Byron Krysher**

Prepared by:

**Quantum Environmental Consultants, Inc.**

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Bennie L. Benford, Jr., Project Manager

## SITE INFORMATION

Project Manager: Mr. Bennie L. Benrford, Jr.

Site Safety Coordinator: Mr. Bennie L. Benford

Facility No: N/A

Site Name: Unidentified Site

Site Address: Rycade School Road (CR 17) and FM 1462

Date Site Safety Plan Prepared: 2/25/09

Date(s) of Site Work: 2/26/09

Site Description and Current / Previous Usage: \_\_\_\_\_

Description and Size of Work Area: see above site address

Hospital Name & Phone Number: [Angleton Danbury General Hospital - 281-393-2117](http://www.angletonhospital.com)

Type of Area: ☐ Industrial ☒ Commercial ☒ Residential

## HAZARD EVALUATION

### Physical Hazards

- ☒ Heat/Cold Stress
- ☐ Noise
- ☒ Traffic
- ☐ Crime
- ☐ Underground Utilities
- ☒ Power Lines
- ☐ Heavy Equipment
- ☐ Drum Handling
- ☒ Pits, Ponds, or Surface Water
- ☒ Confined Spaces/Trenches/Excavations
- ☒ Other (Specify) Snakes

### Chemical Hazard

- ☐ Petroleum/Hydrocarbon
- ☐ Heavy Metals
- ☐ Asbestos
- ☐ PCB
- ☐ Flammable
- ☐ Corrosive
- ☐ Toxic
- ☐ Reactive
- ☐ Unknown
- ☐ Other (Specify) \_\_\_\_\_

### Waste Types

- ☒ Liquid
- ☒ Soil
- ☐ Gas/Vapor
- ☐ Other (Specify) \_\_\_\_\_

On-site water availability (check all that apply): ☐ Drinking ☐ Non-potable ☒ None ☐ Unknown

Work Description: Channel sediment sampling

## EMERGENCY CONTACTS AND NOTIFICATION SHEET

- A. Client: RRC  
Primary: Mr. Brain Voyles (713) 869-5001  
Secondary: Mr. Bryon Krysher (713) 869-5001
- B. Quantum Environmental Consultants, Inc.  
  
Project Manager: Mr. Bennie L. Benford, Jr. (281) 794-7151 or (713) 961-9975  
  
Secondary Contact: Mr. William Beasley (832) 439-6771 or (713) 961-9975  
  
Site Safety Coordinator: Mr. Bennie L. Benford (281) 794-7151 or (713) 961-9975
- C. Emergency Medical Service No: 911
- D. Fire Department No: 911
- E. Police Department No: 911
- F. Angleton Danbury General Hospital (281) 393-2117  
135 E Hospital Drive  
Angleton, TX
- G. OSHA (800) 321-6742
- H. Poison Control No: (800) 764-7661
- I. Chemtrec (800) 424-9300
- J. National Response Center (800) 424-8802
- K. EPA (Region 6) (214) 665-2222
- L. DOT Hazardous Materials (202) 366-4488
- M. Texas Emergency Response Center (512) 463-7727

02/25/09

The personnel listed below have read, understood, and agreed to abide by the site-specific safety and health plan.

[illegible]

## **1.0 INTRODUCTION**

The Health and Safety Plan (HSP) and Site Specific Health and Safety Plan (SSHSP) are documents that establish policies and procedures to protect workers and the public from the potential hazards posed by a hazardous waste site. The SSHSP details procedures and provides contact numbers that are specific to an individual job site. The SSP is to be used in conjunction with the HSP included as Attachment A. In the event of a conflict between the HSP and the SSHSP, the SSHSP takes precedence.

**2.0 SITE HAZARDS****2.1 General Hazards**

POTENTIAL HAZARDS	PRECAUTIONS
1. Traffic	<ol style="list-style-type: none"><li>1. Wear fluorescent safety vest.</li><li>2. Use cones / barricades to indicate work areas.</li><li>3. Maintain the minimum required number of personnel in the work area.</li></ol>
2. Petroleum Hydrocarbon Exposure	<ol style="list-style-type: none"><li>1. Stand upwind if possible.</li><li>2. Wear Nitrile gloves to prevent and splash goggles.</li><li>3. Monitor the vapor concentration in accordance with Section 3.0.</li></ol>
3. Inclement Weather	<ol style="list-style-type: none"><li>1. Stop outdoor work during lightning storms.</li></ol>
4. Power Tools	<ol style="list-style-type: none"><li>1. Use 3-prong, grounded plugs.</li><li>2. Do not use electrically operated tools in wet conditions, or where an explosive hazard exists.</li><li>3. Wear cut-resistant gloves.</li><li>4. Do not place any part of your body or power cords under material that is being cut.</li></ol>
5. Slip, Trip, Fall Hazards	<ol style="list-style-type: none"><li>1. Mark hazards with flagging.</li><li>2. Maintain good housekeeping.</li><li>3. Pay continuous attention to where you are stepping.</li><li>4. Walk at a steady pace.</li><li>5. Use walkways where practical.</li><li>6. Remain aware at all times.</li></ol>
6. Material Handling	<ol style="list-style-type: none"><li>1. Lift with legs; keep back straight.</li><li>2. Use gloves.</li><li>3. Know the weight of the object to be handled.</li><li>4. Clean up metal edges.</li></ol>

### **3.0 AIR MONITORING AND ACTION LEVELS**

Due to the nature of this investigation, and of the chemicals expected, no air monitoring will be required on the job site.



**4.0 MATERIAL SAFETY DATA SHEETS**

## **ATTACHMENT A**

### **Corporate Health and Safety Plan**

# Directions to Angleton, TX 77515-4111, United States

**YAHOO! LOCAL**  
Maps

## Summary and Notes

**START** **A** Fm-1462, Rosharon, TX 77583, United States

**FINISH** **B** 135 E Hospital Dr, Angleton, TX 77515-4111, United States

**Total Distance: 20.8 miles, Total Time: 27 mins (approx.)**

Add your notes here...

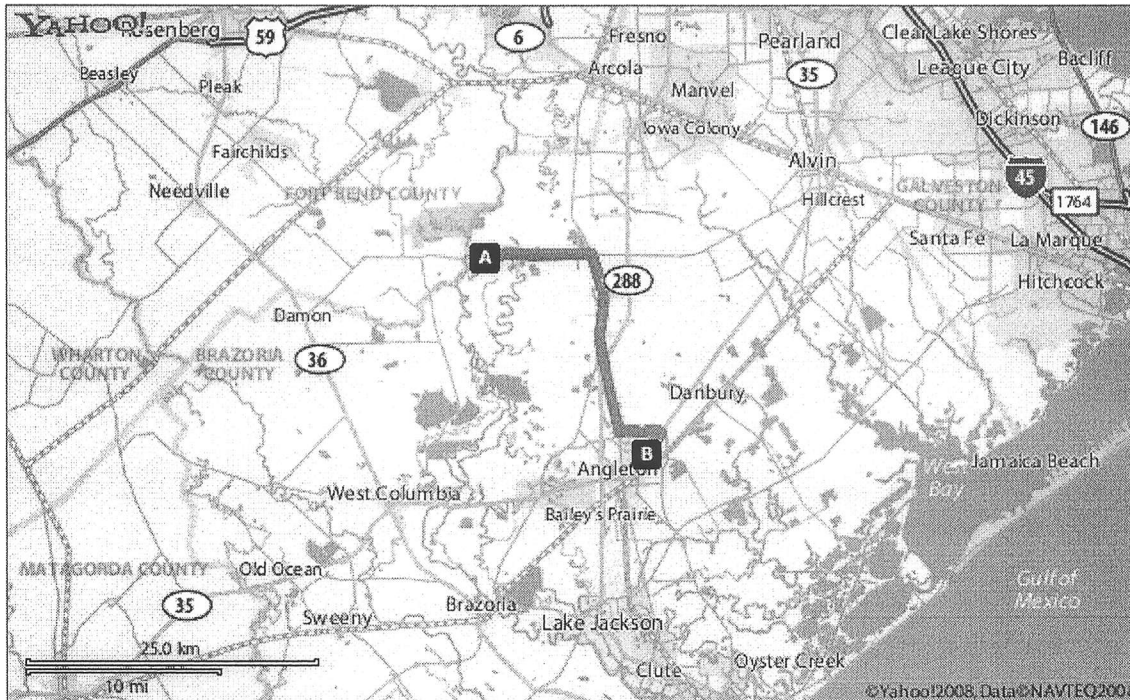
Distance

### **A** FM-1462, ROSHARON, TX 77583, UNITED STATES

1. Start at **FM-1462, ROSHARON** going toward **LOCKRIDGE RD** go **6.1 mi**
2. Turn **R** on **FM 521 RD** go **4.9 mi**
3. Bear **L** on **TX-288-BR S** go **5.8 mi**
4. Turn **L** on **FM 523 RD(FM-523 S)** go **2.5 mi**
5. Turn **R** on **E MULBERRY ST(TX-35)** go **1.5 mi**
6. Turn **L** on **E HOSPITAL DR(CR-443)** go **< 0.1 mi**
7. Arrive at **135 E HOSPITAL DR, ANGLETON**, on the **L**

### **B** 135 E HOSPITAL DR, ANGLETON, TX 77515-4111, UNITED STATES

Distance: 20.8 miles, Time: 27 mins



When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

# Health & Safety Program

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**Quantum Environmental  
Consultants, Inc.  
1308 South Loop West  
Houston, Texas 77054**

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*Safety is the mainstay of our operations.*

## Table of Contents

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<b>1.0 INTRODUCTION.....</b>	<b>3</b>
<b>2.0 MAJOR ELEMENTS OF HEALTH AND SAFETY PROGRAM.....</b>	<b>3</b>
<b>3.0 HAZARD EVALUATION .....</b>	<b>4</b>
<b>4.0 CONTROLS TO MINIMIZE EXPOSURE .....</b>	<b>5</b>
Engineering Controls .....	7
Administrative Controls .....	7
Personal Protective Equipment.....	8
Level D PPE .....	8
Level C or B PPE .....	8
Level A PPE .....	8
<b>5.0 SITE SAFETY PLAN .....</b>	<b>9</b>
<b>6.0 STANDARD EMERGENCY PROCEDURES AND EQUIPMENT .....</b>	<b>9</b>
<b>7.0 SITE CONTROL .....</b>	<b>10</b>
Work Zones.....	10
<b>8.0 PERSONNEL AND EQUIPMENT DECONTAMINATION .....</b>	<b>11</b>
<b>9.0 EMPLOYEE MEDICAL MONITORING .....</b>	<b>9</b>
<b>10.0 EMPLOYEE SAFETY TRAINING .....</b>	<b>12</b>
Initial Safety Training.....	13
Daily Safety Training .....	13
<b>11.0 SITE SAFETY INSPECTIONS .....</b>	<b>14</b>
<b>12.0 GENERAL SAFETY GUIDELINES .....</b>	<b>15</b>
Specific Task Training (SST) .....	15
Meetings.....	15
Inspections .....	15
<b>13.0 HOUSEKEEPING .....</b>	<b>16</b>
Orderliness.....	16
Access.....	17
Slips, Trips and Falls.....	17
<b>14.0 MATERIAL HANDLING .....</b>	<b>17</b>
Material Handling by Hand.....	17
Mechanical Handling.....	17
Material Preparation.....	17
Stability Control .....	17



## Table of Contents (Continued)

Rigging .....	18
Miscellaneous Tools and Equipment .....	18
Hooks, Shackles, Beam Clamps and Checkers .....	18
Chain Falls and Hoists .....	19
Rope .....	19
<b>15.0 PERSONAL PROTECTION .....</b>	<b>20</b>
Personal Safety Equipment .....	20
Clothing .....	20
Head Protection .....	20
Eye Protection .....	20
Ear Protection .....	20
Face and Neck Protection .....	20
Finger, Hand and Wrist Protection .....	20
Gloves .....	20
Tool Holders .....	20
Tag Lines .....	20
<b>16.0 SIGNS AND BARRICADES .....</b>	<b>21</b>
Signs .....	21
Lock Out Tag Out (Danger Tags) .....	21
Permits .....	21
Confined Space .....	21
Hot Work Permit .....	21
Excavation Permit .....	22
Barricades .....	22
<b>17.0 EXCAVATIONS .....</b>	<b>22</b>
<b>18.0 HAZARD COMMUNICATION (RIGHT TO KNOW) .....</b>	<b>22</b>
<b>19.0 SITE SPECIFIC HEALTH &amp; SAFETY PLAN .....</b>	<b>23</b>



# Quantum Environmental Consultants, Inc.

## *Health & Safety Program*

### **1.0 INTRODUCTION**

Employee health and safety is given top priority on all Quantum Environmental Consultants, Inc. managed work sites. Your employer is responsible for providing you a safe place to work in accordance with federal, state and local regulations. However, QEC, Inc. is a concerned “Quality” company and as a contractor, subcontractor, employee or visitor, your safety is equally important to QEC, Inc.

The success of this Health and Safety Program rests in the firm commitment of all members of the workforce to plan and practice safety. Every manager and supervisor is responsible for the observance of all federal, state, client, and project guidelines governing safety in the workplace. They must accept the responsibility and be held accountable for the safety of every employee under their directions. Each employee is accountable for his/her own actions and must observe the safety rules and instructions applicable to the workplace. All unsafe acts or conditions are to be reported promptly to your immediate supervisor.

A safe place to work is the goal of everyone. Through everyone’s efforts, we constantly strive to improve safety techniques and to reduce hazards. You are urged to do your part in making the workplace a safe area for yourself and others. The overall safety program can be improved by properly using the safety equipment provided, by avoiding unsafe practices and acts, by cooperating with your supervisor and by following these safety guidelines.

### **2.0 MAJOR ELEMENTS OF HEALTH AND SAFETY PROGRAM**

The Health and Safety Program is a comprehensive program that has been developed to minimize unsafe conditions and promote safe work practices throughout the organization. QEC, Inc. believes that all accidents and occupational injuries are preventable. QEC, Inc. employees are provided with the necessary training and equipment to perform their tasks in a safe and efficient manner.

The Health and Safety Program consist of the following elements.

- Hazard Evaluation
- Controls to Minimize Exposures
- Preparation of Site Specific Health and Safety Plans
- Employee Training



- Employee Medical Monitoring
- Site Inspections
- General Safety Training
- Housekeeping
- Material Handling
- Tools
- Mobile Equipment
- Signs and Barricades
- Ladders and Scaffolds
- Excavations
- Welding and Cutting
- Electrical
- Fire Protections
- Hazardous Materials
- Hazard Communication

Responsible managers have an obligation to provide a safe workplace for their employees and to investigate each accident in order to identify corrective actions, which will minimize the reoccurrence of that accident. Each Project Manager is responsible for identifying the chemical and physical hazards that may exist on project sites and implementing controls that are necessary to protect personnel on site. QEC, Inc. employs trained safety professionals who are involved in safety related matters, including medical monitoring and project safety training programs and procedures. A site safety officer is assigned to large scale remediation projects to check and implement site safety procedures.

### **3.0 HAZARD EVALUATION**

Before a project starts, work sites are inspected to identify particular hazards and define appropriate hazard controls. This inspection is performed by the Project Manager or Site Safety Officer in conjunction with experienced operational personnel. Hazards are evaluated for their effect on operations and personnel safety. The hazard evaluation serves as the basis for the Work Plan and Site Specific Health and Safety Plan. These plans are prepared before the field work begins. Site specific training is provided for the employees assigned to the project to





discuss the work plan and the provisions to evaluate minimized personnel exposures to hazardous materials.

QEC, Inc follows, as a minimum, the procedures established in the current NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, United States Government Printing Office. This manual is augmented with QEC, Inc.'s specific policies.

#### **4.0 CONTROLS TO MINIMIZE EXPOSURE**

QEC, Inc. uses different types of controls to minimize personnel exposure to hazardous materials. Engineering controls are given preference to reduce exposure. If this is not practical or sufficient, QEC, Inc. provides administrative controls and Personal Protective Equipment (PPE).

##### **Engineering Controls**

It is the policy to use engineering controls in hazardous situations since this provides the best control. Engineering controls on projects are implemented through the use of custom designed and fabricated equipment. For example, a barrel grapple may be used to eliminate manual handling of drums. The barrel grapple enables the operator to be placed at least 20 feet from the drums. Additional plexiglas shielding could be installed on the Track hoe and air tank racks to provide the operator with a source of breathing air. Not only does the grapple increase project safety, but it also greatly increases productivity on large drum handling projects. A second example of engineering control is the use of large-capacity shears. These mechanical shears, mounted on the boom, allow an operator of a wheeled or tracked vehicle to cut tanks, pipes, beams, and girders from the safety of the vehicle. The use of hydraulic shears eliminates or reduces the potential for fires or explosions inherent with torch cutting or spark-producing sawing.

##### **Administrative Controls**

Administrative controls are used to control hazards potential for standard operations. QEC, Inc. has developed and requires the use of Company protocols for classically and potentially hazardous procedures such as confined-space entry, trenching/digging, high pressure washing, scaffolding, "hot work", and underground storage tank removal.

These specific safety controls delineate exactly what procedures must be put into place before the work can be started. These procedures specify require atmospheric testing, safety equipment, and training. Specific controls are required by the Site Specific Health and Safety Plan to minimize personnel exposures to hazardous materials at each work site.



## Personal Protective Equipment

Where engineering or administrative controls are not feasible or may not be completely effective, QEC, Inc. personnel are placed in protective clothing and respirators to prevent exposure. In each such instance, the Project Manager or Site Safety Officer assigned to the project uses all available information to provide the level of protections which will provide adequate protection for the QEC, Inc. employee. If a question or doubt exists, the next higher level of respiratory protection or contact protections is mandated by the Site Safety Plan. On some sites, trained technicians may use sensitive industrial hygiene sampling devices to continuously sample air contaminants. Action levels are established to designate the type of respiratory and skin contact controls.

Levels of contact and respiratory protections are specified based on contact hazards, which are present and levels of chemicals and physical agents in the atmosphere. Four levels of protection have been established:

### Level D PPE

Level D protection does not provide any special protection from chemicals and may be worn only in clean areas. This equipment is defined as steel-toed work boots, hard hat (with face shield when necessary), cotton or leather gloves, work clothes, hearing protection and eye protection.

### Level C or B PPE

For work inside the exclusion zone, Level C or Level B PPE may be required and the following equipment may be used: saran-coated tyvek protective suit with hood (when casual contact with liquids are anticipated); PVC splash suit (required for drum sampling or work with drummed liquids); tyvek coveralls (when operations are taking place where only minor contact with drum materials is possible); steel-toed shoes/boots; vinyl sample gloves; PVC, nitrile, or Viton gloves; (in addition to PVC gloves when barrel sampling); hard hat; job-issued cotton coveralls; and respiratory protection - *Level C Air Purifying* and *Level B Air Supplied*. All joints between various garments will be sealed with vinyl duct tape.

### Level A PPE

Level A PPE consist of a fully encapsulating suit with attached gloves, boots and headpiece, air-supplied respirator (either air line or Self Contained Breathing Apparatus, depending on situations), and tyvek coveralls.



## 5.0 SITE SAFETY PLAN

A Site Safety Plan is prepared before any hazardous job begins. It is used to describe the hazards likely to be encountered during the course of the project and the methods to reduce one's exposure. The plan also outlines emergency procedures to be implemented in the event of an emergency. An outline for a typical Site Safety Plan is provided in Table 5.1 below.

**Table 5.1 - Outline for Typical Site Safety Plan**

<b>Description of Work</b>	<b>Description of Site Hazards</b>	<b>Description of Work Zones</b>
	<ul style="list-style-type: none"> <li>Physical</li> <li>Chemical</li> <li>Environmental</li> </ul>	<ul style="list-style-type: none"> <li>Exclusion</li> <li>Contamination Reduction</li> <li>Support</li> </ul>
<b>Decontamination Stations</b> <ul style="list-style-type: none"> <li>Support</li> </ul>	<b>Protective Equipment</b> <ul style="list-style-type: none"> <li>Respiratory</li> <li>Contact</li> </ul>	<b>Decontamination Procedures</b> <ul style="list-style-type: none"> <li>Personnel</li> <li>Equipment</li> </ul>
<b>Medical-Monitoring Procedures</b> <ul style="list-style-type: none"> <li>Standard Program</li> <li>Specific Monitoring</li> <li>Heat Stress Monitoring</li> </ul>	<b>Emergency Procedures</b> <ul style="list-style-type: none"> <li>Emergency Equipment</li> <li>Contingency Plans <ul style="list-style-type: none"> <li>Spill Control</li> <li>Fire</li> <li>Medical Emergency</li> <li>Heavy Weather</li> <li>Vapor Release</li> </ul> </li> </ul>	<b>General Safety</b> <ul style="list-style-type: none"> <li>Designation of Site Safety Officer</li> <li>Safety Log</li> <li>Trenching &amp; Excavations</li> <li>Storage of Flammable, Compressed Gases</li> <li>Safety Inspections</li> </ul>

## 6.0 STANDARD EMERGENCY PROCEDURES AND EQUIPMENT

Standard emergency procedures are established at all QEC, Inc. work sites. These include fire procedures, medical emergency, chemical exposure, and inclement weather. At sites where the conditions require, procedures are established for toxic vapor releases, liquid spills, and site emergency evacuations.



Even though a careful hazard evaluation and control program is being followed by trained, skilled personnel, the potential for an accident exists and must be considered. All work sites are established with the appropriate emergency equipment to control all foreseeable events.

Standard emergency equipment at all sites includes first-aid kits, fire extinguishers, portable emergency splash showers, emergency oxygen kits and eyewash facilities.

## 7.0 SITE CONTROL

Site control is necessary to prevent or reduce the transfer of hazardous materials (contaminants) from the project site by workers and equipment involved in site operations. Site control involves two major components:

- Physical arrangements and control of the site work area.
- Methods for the removal of contaminants from personnel and equipment.

Site control can be accomplished in a number of ways, including physical barriers to exclude unnecessary personnel; checkpoints limiting access to the site or areas within the site, minimizing personnel and equipment on site consistent with effective, safe operations; establishment of containment zones; decontamination procedures; and conducting operations in a manner to reduce the possibility of contamination.

The use of three-zone system of area designation, access control points, and exacting decontamination procedures protects against the translocation of contaminating substances. This control system is based on a “worst-case” situation. Less stringent site-control and decontamination procedures may be used based upon more accurate information on the types of contaminants involved and the contaminating hazards they present.

### Work Zones

One method of reducing the potential for transfer of contamination is to delineate zones or work areas within the vicinity of the incident based upon expected or known level of contamination. Within these zones, prescribed operations will occur, utilizing appropriate personal protective equipment. Movement between zones will be controlled at checkpoints. Three contiguous zones are recommended: Exclusion Zone (contaminated), Contamination-Reduction Zone (where decontamination takes place), and the Support Zone (noncontaminated areas).

- **Exclusion Zone:** The exclusion zone is considered contaminated and prescribed levels of protection must be worn by all entering personnel. An entry checkpoint is established at the periphery of the exclusion zone to control the flow of personnel and equipment to ascertain that the procedures established to enter and exit the zones are being followed. The boundary



should be physically secured, fenced, posted, or well defined by geographical boundaries. Basic air monitoring and site sample analysis are the governing factors for determining the range of specific boundary perimeters.

- ***Contamination-Reduction Zone:*** The purpose of the Contamination-Reduction Zone (CRZ) is to provide an area to prevent or reduce the transfer of contaminants which may have been picked up by personnel or equipment returning from the exclusion zone. All decontamination activities occur in this zone.

The boundary between the support zone and the CRZ is the “contamination control line”. This boundary separates the possible contaminated area from the clean zone. Entry into the CRZ from the clean zone is through an access control point. Personnel entering at this station are wearing the prescribed personal protective equipment for working in the CRZ.

At the boundary between the CRZ and the exclusion zone is the “hot line” and access control station. Entrance into the exclusion zone requires the wearing of the prescribed personal protective equipment, which may be different than the equipment requirements for working in the CRZ. At a point close to the “hot line”, a personnel and/or equipment decontamination station is established for those exiting the exclusion zone. In some cases, another decontamination station is needed closer to the contamination control line for those working only in the CRZ.

***Support Zone:*** The support zone is the outermost area of the site and is considered a noncontaminated or “clean” zone. It is designated as a controlled-traffic area for authorized support personnel and the location for support equipment. Since normal work clothes are the appropriate apparel within this zone, potentially contaminated personnel clothing, equipment, etc., are not permitted.

## 8.0 PERSONNEL AND EQUIPMENT DECONTAMINATION

Wherever contamination of personnel or equipment is possible, the Site Safety Plan specifies appropriate step-by-step decontamination procedures. This ensures that personnel are not exposed, equipment leaves the site properly cleaned, and contamination is not moved from the site.

To avoid personnel contamination and the subsequent transfer of hazardous substances to clean areas, a thorough decontamination process is required for personnel and equipment involved in fieldwork or investigations. The specific decontamination procedures will be described in the Site Specific Plans. Suitable decontamination facilities will be provided at required work sites.

## 9.0 EMPLOYEE MEDICAL MONITORING



The Medical and Health Monitoring Program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A QEC, Inc. worker medical profile is shown in Table 9.1.

**Table 9.1 - Worker Medical Profile**

<i>ITEM</i>	<i>INITIAL</i>	<i>ANNUAL</i>
Medical History	X	X
Work History	X	X
Visual Acuity	X	X
Pulmonary Function Tests	X	X
Chest X-Ray	X	X
Electrocardiogram/Stress Test	X	X (based on age)
Complete Blood Counts	X	X
Blood Chemistry (SMAC-23)	X	X
Complete Urinalysis	X	X
Dermatology Exam	X	X
Physical Examination	X	X

## 10.0 EMPLOYEE SAFETY TRAINING

Safety training is an integral part of the QEC, Inc. safety program. Safety training begins with an initial safety training program for new employees and is augmented by daily training at project sites. Training records are maintained to confirm that all employees are adequately trained for their job assignments. All personnel working on hazardous waste sites have received the appropriate training as mandated by OSHA 29 CFR 1910.120 Hazardous Waste Site Operations And Emergency Response Training.

### Initial Safety Training

Initial safety training introduces new employees to the potentially hazardous work associated with environmental restoration projects and involves both classroom and on the job training.



Classroom training includes chemical hazards, protective equipment, basic safety procedures, and company safety policies. Personnel are fit tested for respirators and receive basic training on the respiratory equipment used in the field. Following classroom training, personnel are trained under simulated field conditions while wearing protective equipment.

## Daily Safety Training

Each day, before site work begins, planning and safety meetings are held to inform each work team of the day's activities and pertinent safety considerations. A specific safety topic is also addressed. Hazard identification, warning, and contingency plans are developed in advance, and employees are briefed on their involvement should these plans be needed. Personnel are encouraged to report potential and actual problems to foremen and supervisors during the workday as well as during the safety meetings. The presentations may take the form of a leader from the Operations or Health and Safety Department using a prepared outline or a commercially produced video on a safety topic of interest. Some selected training topics are shown on the following table:

**Table 10.2 - Selected Safety Training Topics**

<b>Company Safety Procedures</b>	<b>Basic Equipment</b>	<b>New Employee Orientations</b>
<b>Respiratory Protection</b> <ul style="list-style-type: none"> <li>◆ Self Contained Breathing Apparatus</li> <li>◆ Manifold systems</li> <li>◆ Emergency Escape Breathing Apparatus <ul style="list-style-type: none"> <li>◆ Fit Check, Maintenance</li> <li>◆ Cartridge Selection</li> <li>◆ Ingress and Egress Techniques</li> </ul> </li> </ul>	<b>Protective Clothing</b> <ul style="list-style-type: none"> <li>◆ Acid Splash Suit</li> <li>◆ Disposable Suit</li> <li>◆ Fully Enclosed Suit</li> <li>◆ Boot and Glove Type</li> <li>◆ Eye Protection</li> <li>◆ Foot and Head Protection</li> </ul>	<b>Decontamination and Hygiene</b> <ul style="list-style-type: none"> <li>◆ Respirators</li> <li>◆ Protective Clothing</li> <li>◆ General Equipment</li> <li>◆ Personal Hygiene</li> </ul>
<b>Specific Operational Training</b> <ul style="list-style-type: none"> <li>◆ Heavy Equipment</li> </ul>	<b>Advanced Training</b> <ul style="list-style-type: none"> <li>◆ Field Leadership and Management</li> </ul>	<b>Specialty Topics</b> <ul style="list-style-type: none"> <li>◆ Hazardous Assessment and Mitigation</li> </ul>



<ul style="list-style-type: none"> <li>◆ First Aid</li> <li>◆ CPR</li> <li>◆ OSHA Safety Courses</li> <li>◆ Buddy System</li> <li>◆ Field Analytical Techniques and Sampling</li> <li>◆ Emergency Procedures</li> </ul>	<ul style="list-style-type: none"> <li>◆ Reference Sources</li> <li>◆ Process Development</li> </ul>	<ul style="list-style-type: none"> <li>◆ Reference Sources</li> <li>◆ Chemical Characteristics</li> <li>◆ Process Design</li> <li>◆ Others as required or requested</li> </ul>
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## 11.0 SITE SAFETY INSPECTIONS

At major sites, a Site Safety Officer (SSO) is assigned whose function is to evaluate the potential for hazardous situations by frequent inspection, enforcement of company safety procedures and policies, and administration of the QEC, Inc. permit procedures. At smaller work sites, the Site Operations Supervisor is designated as the SSO. Responsibilities of the SSO include daily safety training; OSHA/USEPA compliance; maintenance of the Site-Safety Log; periodic safety inspections; maintenance of permit procedures for confined-space entry, hot work, and tank removal; daily inspection of safety equipment; and first aid.

Members of QEC, Inc.'s executive management team visits each site periodically to inspect the implementation of the site safety program and make recommendations about the implementation of the program elements.





## **12.0 GENERAL SAFETY GUIDELINES**

Experience has shown that the “Safety Tools” provided in the following sections, thoughtfully applied by Supervisor and Employee alike, contribute dramatically to an injury-free workplace. This section provides instruction on the proper use of these tools.

### **Specific Task Training (SST)**

Before assigning an employee to any new or repetitive job, the Supervisor is responsible for giving him/her Specific Task Training. That is, showing and explaining the safety precautions and actions that must be taken before proceeding with the task. Each employee is responsible for understanding and following the safest means to perform their assignment. No job is to start until a complete understanding of the task to be performed is provided by the Supervisor.

### **Meetings**

Daily “Tailgate” meetings are held at each project location. The purpose of these meetings is to place accident prevention’s foremost in the minds of each individual and to acquaint all participants in the project with the necessary overall preventative action.

### **Inspections**

Each Supervisor and employee are instructed to make a quick check of the work area at the start of the shift each day to ensure safe working conditions - condition of shoring, access, power equipment moving in, new excavations, occupancy by other groups, workers moving in overhead, or any other changing conditions.

## **13.0 HOUSEKEEPING**

### **Orderliness**

All project sites are maintained in a neat orderly fashion to encourage safe work habits. Major considerations include:

- ◆ Keep tools and working materials in proper containers.
- ◆ Store trash, waste and scarp in correct containers.
- ◆ Store materials safely.
- ◆ But cigarette stubs in butt cans.



- ◆ Keep small items in boxes or bins.
- ◆ Keep the floor clear of tools, rod ends and metal shavings.
- ◆ Keep walkways clear.
- ◆ Ensure that work tables are occupied only by work at hand and tools required for work being done.
- ◆ Store or contain material so that fire has no place to start.
- ◆ Clean up tools and work areas as your job progresses.
- ◆ Keep cords and hoses seven feet overhead or lay them flat outside of walkways.
- ◆ Keep all material, tools and equipment in a stable position (tied, stacked or choked) to prevent rolling or falling.
- ◆ Maintain clear access to all work areas.
- ◆ Keep stairways clear of debris.

## **Access**

Routes leading to and from all work locations must be free and clear of obstructions, and well lighted except in special instances approved by tank work or restricted access. Walkways and stairways must be clear, ladders must not be blocked, and emergency exits must be identified and clear. Check with your Supervisor regarding route and access to be used in and out of excavations, roofs, equipment areas, buildings, process areas, etc.

## **Slips, Trips and Falls**

- ◆ Practice safe walking skills, particularly in congested areas (shorter steps).
- ◆ Pay continuous attention to where you are stepping.
- ◆ Clean spills right away.
- ◆ Keep your hands free for balance.
- ◆ Walk at a steady pace.
- ◆ Wear slip-resistant shoes.
- ◆ Take walkways and access provided.
- ◆ Keep work areas well lit and clean.



## 14.0 MATERIAL HANDLING

### Material Handling by Hand

When handling, moving or lifting material by hand remember the following:

- ◆ Consider your back.
- ◆ Lift with the legs; keep the back straight; don't use your back muscles.
- ◆ Use gloves when working with sharp or abrasive objects or where splinters are possible.
- ◆ Know the weight of the objects to be handled. If weight is excessive or the size of the object is cumbersome, get help or consult your Supervisor.

### Mechanical Handling

- ◆ Get rigging instructions from your supervisor before beginning.
- ◆ Know the weight of the object to be handled.
- ◆ Know the capacity of the handling device (crane, forklift, chain fall, come-along).
- ◆ Use tag lined to control loads.

### Material Preparation

- ◆ Clean up ragged metal edges.
- ◆ Pull all protruding nails and works or bend them flush. Store on dunnage for ease of handling.

### Stability Control

Ensure that your body, material, tools and equipment are safe from such unexpected movement as falling, slipping, rolling, tripping, blowing or other uncontrolled motion.

- ◆ Use safety belts as required.
- ◆ Protect the area below you.
- ◆ Put absorbent on all grease and oil spills immediately, then clean up.
- ◆ Trucks (i.e., flat beds) hauling equipment or material must not be moved once rigging has been released.



- ◆ Chock all material and equipment (such as pipe, drums, tanks, reels, trailers, and wagons) as necessary to prevent rolling.
- ◆ Tie down all light, large-surface-area material that might be moved by the wind.
- ◆ When working at heights, secure tools, equipment and wrenches against falling.
- ◆ Do not store materials or tools on grits, ducts, lighting fixtures, beam flanges, hung ceiling or similar elevated conditions.

## **Rigging**

- ◆ Know the proper use of chain falls come-along, checkers, shackles and clamps.
- ◆ Never raise a load over people.
- ◆ Use tag lines to control the loads.
- ◆ Know the capacities of rigging equipment and weights of loads.

## **Miscellaneous Tools and Equipment**

### **Hooks, Shackles, Beam Clamps and Checkers**

- ◆ Only one eye in a hook. Use a shackle to hold two or more eyes.
- ◆ All hooks must have a safety latch or be moused (steel erection and shake out hooks are exceptions).
- ◆ Always place a load in the center of a hook and never on the point.
- ◆ Get approval from your Supervisor before ripping from any structural member to ensure that it will support the load being raised.
- ◆ Never use plate grips, tongs, pipe clamps as substitutes for beam clamps.
- ◆ Hooks, shackles and beam clamps should be inspected before use. Do not exceed the capacity marked on the Equipment.



## Chain Falls and Hoists

- ◆ A chain hoist must be used within its rated capacity.
- ◆ Make sure the capacity is marked on the equipment.
- ◆ Chain hoists are designed so that one person can operate the hand chain to lift the maximum load for the chain hoist.
- ◆ Do not leave an unsecured and unattended load hanging on a hoist or a chain fall.
- ◆ Do not stand or have any part of the body below a load suspended on a chain hoist.
- ◆ Do not wrap the load chain around the load to be lifted.
- ◆ Every chain hoist should be inspected before making a lift. Your visual check should include the hooks for any irregularities, the chain for wear or damage, and the housing and sheaves for any signs of damage from abusive treatment.
- ◆ Use softeners, where possible to obtain a bite on material being rigged.

## Rope

- ◆ Wire: Inspect for frays, kinks, broken wires and worn spots before using.
- ◆ Fiber: Inspect for excessive broken fibers, wear and deteriorated inner and outer strands before using.

**Table 14.6.3-1 Safe Working Load Chart\***

WIRE ROPE SIZE (IN)	STRAIGHT PULL	CHOKE HITCH	BASKET HITCH
3/8	1.1	0.8	2.2
7/16	1.5	1.1	3.0
1/2	2.0	1.5	4.0
9/16	2.5	1.8	5.0
5/8	3.1	2.3	6.2
3/4	4.5	3.3	9.0
7/8	6.5	4.8	13.0
1.0	7.9	5.9	15.8

(Chart does not apply to crane revving)

\* Figures above are for 6x37 improved plow steel, fiber core, and mechanical eye splice.



## **15.0 PERSONAL PROTECTION**

### **Personal Safety Equipment**

- A hard hat must be worn at all times.
- Approved safety glasses, with side shield, must be worn by all employees during work hours on the worksite.
- Steel toe safety shoes or boots must be used when the potential for serious foot injuries exists.
- A safety belt with lanyard must be worn and used in elevated areas six feet or more when not protected from falls; also in precarious situations where fall protection is not provided.
- Respirators and rubber gloves are required for special jobs.
- Hearing protection is required for many jobs in designated areas.

### **Clothing**

All clothing worn must comply with general work and safety practices. Do not wear clothing that could get caught in machinery or otherwise cause an accident (e.g., dragging pants, baggy shirts, torn or long sleeves). Shirts and sleeves and long pants must be worn at all times. Overalls or pants must not have loose, torn or dragging fabric. Pants legs without cuffs are recommended.

### **Head Protection**

During work hours, employees will wear hard hats in good condition that will meet ANSI Z89.1-1971 and ANSI Z89.2-1971 Standards.

### **Eye Protection**

Approved safety glasses with side shield must be worn by all employees during work hours in all work areas except offices. Additional eye or face protection such as goggles, face shields and welding shields are required at all times when engaged in operations such as welding; burning; grinding; chipping; handling chemicals, corrosive liquids, or molten materials; drilling; driving nails; and pouring concrete.

Employees engaged in welding must use filter lenses or plates of not less than No. 10 shade. Employees engaged in helping welders should not look directly at the welding process and must use approved eye protection.



Burring goggles with a minimum No.4 density and plastic cover plate on both sides of the filter lens are required for all gas welding and burring.

### ***Precautions***

- Know the locations of eyewash stations (chemical or industrial plants, refineries, etc.)
- Flood eyes with water if contact with chemical matter is suspected.
- Report all incidents to your supervisor immediately.
- Do not try to remove foreign matter yourself.
- Keep hands away from eyes.

### **Hearing Protection**

Approved hearing protection must be worn as specified in all posted areas and while working with or around high-noise-level producing machines, tools or equipment.

### **Face and Neck Protection**

Face shields must be worn under the following circumstances:

- Working with tar pots.
- Working with molten lead and acids.
- Performing grinding operations.
- Using power saws and other tools/equipment that discharge solid material.

Welding can cause arc burns. Keep your face and neck suitable protected. Loose neckties, jewelry or frayed shirts are not to be worn around machinery,

### **Finger, Hand and Wrist Protection**

#### **Gloves**

Suitable gloves should be worn when handling materials and equipment.

- Plastic or rubber-coated gloves are to be used for special types or work (e.g., solvents and chemical hazards).



### **Tool Holders**

Use tool holders with driving stakes or wedges or when holding star drills, bull points and similar driven tools.

### **Tag Lines**

Tag lines are used to control loads and to keep individuals away on all lifts made by mechanical equipment - HANDS OFF LOAD! Do not wrap tag lines around hands or body.

Materials should be secured when using power tools, do not depend on your ability to hold against the power of a machine. Rings and other jewelry are discouraged in the project work areas and should not be removed while using power tools.

## **16.0 SIGNS AND BARRICADES**

### **Signs**

Use signs when necessary and remove them promptly when no longer required. Pay attention to signs - they mean what they say. Numerous warning and instruction type signs are available. Signs are to be placed on barricade stands, posts or other suitable locations. Before work starts they must be placed where they will be most effective and removed to proper storage when they are no longer needed. Signs must be legible.

### **Lock Out/Tag Out (Danger Tags)**

Danger tags are placed on switches and valves that must not be operated; they are printed with the words “ HANDS OFF - DO NOT OPERATE”. Danger tags are used only to prevent operation of a switch, valve or piece of equipment in cases where someone may get hurt or equipment may be damaged. Observe the following guidelines for danger tags:

#### ***DO***

- Place your tag and lock personally - Do not have someone else do it.
- Sign the tag, date it, and put your identification number on it.
- Have a Construction Electrician lock and tag all electrical switches before you place your tag.
- Use only the standard Danger Tag.
- Remove your lock and tag when you have completed your work.





- All tags placed by electricians must be accompanied by their lock.
- TRY the switch after locking and tagging and before starting work to make sure you have locked out the correct one.

### ***DON'T***

- Don't remove someone else's tag or operate a valve, switch or device that has another person's danger tag attached. You are subject to immediate removal from the job site if you do so.
- Don't lock and tag a device unless specifically instructed to do so by your Supervisor.
- Don't place danger tags on defective tools and equipment.

## **Permits**

### **Confined Space**

Normally considered enclosures having limited means of access and egress, e.g., tanks, vessels, bins, silos, boilers, pits, septic tanks, sewers, underground utilities, pipelines and similar structures.

Do not enter a tank or confined space until a valid Confined Space or Entry Permit, signed by the responsible supervisor, is posted at the work site and you are in compliance with the permit. An example of QEC, Inc.'s Confined Space Permit is attached.

### **Hot Work Permit**

Flame or spark producing activity in certain operating areas and in some construction areas require the use of a Hot Work Permit.

### **Excavation Permit**

Excavating, concrete breaking, or drilling inside or outside buildings where potential danger exists require the use of an excavation permit.

### **Barricades**

Barricades are required around most excavations, holes, or openings in floor or roof areas, edges of roofs and elevated platforms, around certain types of overhead work, and wherever necessary to warn people against falling in, through or off. Warning barricades call your attention to a hazard but offer no physical protection, e.g., yellow caution tape.



## **17.0 EXCAVATIONS**

Each company performing excavation work must have a designated and trained competent person on site. Appropriate documentation to meet the OSHA trenching and excavation standards is to be kept on site at all times. Excavations must be barricaded to alter pedestrian and vehicular traffic. Bumper guards (i.e., wheel chocks, timbers) should be used to prevent vehicles and equipment from overrunning the excavation edge. Spoil dirt may be used to barricade one side of the excavation; all dirt must be poled at least two feet from the edge of the excavation and must be at least three feet high when used in making a barricade:

Remember the following guides for excavations:

- Equipment spotters must wear an orange neon vest while directing equipment for grading, filling, excavation or compaction work.
- Barricade excavation areas before the hole is opened or ahead of work progress.
- Excavations must be sloped or shored when deeper than five feet.
- Check all excavation walls before entering and after a heavy rain or thaw. Check shoring daily or more often in extremely wet weather.
- An excavation permit is required before digging in some construction areas.
- No one is permitted in an excavation when equipment is working next to the edge.
- Excavations are to be monitored for gas, oxygen and chemical hazards because many excavations are considered a confined space.
- Excavations must be provided with a ladder for access and egress at intervals of 25 feet. The ladder must be secured.
- The maximum legal slope without soil classification is 34 degrees or 1 ½ feet horizontal to 1 foot vertical.

## **18.0 HAZARD COMMUNICATION (RIGHT TO KNOW)**

If you are working with hazardous chemicals or may come in contact with hazardous chemicals, you must be provided information and training concerning these hazardous chemicals by your employer. This training will include, but not be limited to:

- An explanation of the Project Hazard Communication Program and its location.
- Notification of the training requirements of the Hazard Communication Standard.
- Instruction on how the Project Training Program accomplishes the federal requirements.



- Notification of the locations of the hazardous chemicals.
- A description of the labeling system.
- A description of the client hazard rating system
- A description of the Material Safety Data Sheets (MSDS), their use, and location.

If you have any concerns or desire any information regarding chemicals in your workplace, ask your Supervisor for the information.

## **19.0 SITE SPECIFIC HEALTH & SAFETY PLAN**

For large scale remediation projects a Site Specific Health & Safety Plan is typically developed and submitted to the Engineer for approval prior to initiating work. For small scale projects the attached Health & Safety / Site Security Plan is used and addresses the following:

- Project / Client Information
- Product / Contaminant Involved
- Site Activities
- Chain of Command
- Identification of Outside Organizations Involved
- Site Security and Control
- Decontamination
- Area Map
- Monitoring (If Required)
- Tailgate Safety Meeting
- Personal Protective Equipment
- Emergency Communications / Alerting
- Site Safety Concerns
- Medical Emergencies
- Chemical Hazard Data
- Confined Space Requirements
- Supervisors Checklists

